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this is a very useful and much-needed textbook, and will exert a strong influence to extend the knowledge of the correct method of the comparison and combination of observations, which is so essential, not only to the progress of astronomy and geodesy, but to physics and chemistry as well, and to every branch of science which deals with refined measurements of quantity of any kind by the help of instruments of precision.

THE SOCIETY FOR PSYCHICAL RESEARCH.

Proceedings of the Society for psychical research.
Vol. i. (containing parts i.-iv.). London,
Trübner & Co., 1883. 337 p. 8°.

THE four reports of the Society for psychical research which have been issued at intervals during 1882 and 1883 have now appeared in the form of a handsome volume, and it cannot be denied that they constitute a formidable body of evidence in favor of certain beliefs which have hitherto been looked upon with peculiar suspicion and distrust. A brief *résumé* of the testimony does not do it justice, for it derives its weight from the cumulative effect of its large amount. No one who is interested in bringing fresh regions of ignorance under the domain of scientific investigation should fail to read the proceedings for himself.

The society was organized on Feb. 20, 1882 ; but several of its members had been engaged in private research in the same direction for some years before. Its object was stated to be the investigation of an important body of remarkable phenomena, resting upon the testimony of many competent witnesses, including observations recently made by scientific men of eminence in various countries, and *primâ facie* inexplicable on any generally recognized hypothesis. The distinction of its founders is such as to completely dissociate it from the race of the long-haired, and to insure at once respectful consideration for whatever facts it vouches for. They include such names as Balfour Stewart, Arthur Balfour, Professor Barrett, Edmund Gurney, F. W. H. Myers, Archbishop French, and Professor Henry Sidgwick (the president). The members are not committed to any theory, and are not advocates of any cause. It is their intention to remove, if possible, what they justly say is a great scandal,—the existing state of absolute doubt as to whether phenomena testified to by a large

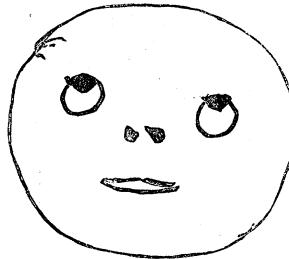
number of generally credible witnesses, and of great scientific importance if true, can be properly authenticated or not. Their experiments are conducted with the most rigid precautions against deception and mistake, and, what is equally important, recorded with scientific precision. Six committees were formed for the consideration respectively of thought-reading, mesmerism, Reichenbach's experiments in regard to a peculiar sensitiveness to electric currents, apparitions and haunted houses, physical phenomena, and the collection and collation of existing materials bearing on the history of these subjects. Of their several reports, those of the committee on thought-reading, or thought-transference, as they call it later, are the most striking. The signification of the term 'thought-transference' is limited to the communication of a vivid impression or a distinct idea from one mind to another, without the intervening help of the recognized organs of sensation. No account is taken, very naturally, of experiments in which there is physical contact between the persons concerned, or in which there is the slightest possibility of conveying information by sight or hearing. The extreme perfection to which a code of signals may be brought leads the committee to distrust all observations where two particular persons are necessary for the results obtained. Their most remarkable subjects for thought-transference have been found in a family in Derbyshire, that of Mr. Creery, a clergyman of high character, whose integrity has, as it happens, been exceptionally tested. He has five daughters, of ages between eleven and eighteen, all thoroughly healthy, and as free as possible from morbid or hysterical symptoms. All of these children except the youngest are able to designate correctly, without contact or sign, an object fixed on in the child's absence,—not, indeed, every time, but far more frequently than probability would allow as the result of chance. The child, on returning to the room, stands close to the door, amid absolute silence, with her eyes on the ground : often she does not return, but guesses from the adjoining room, with the door closed. The children have been experimented upon at their home by the committee, by Professor Barrett, by Mr. and Mrs. Sidgwick, and by Professor Balfour Stewart, as well as at the houses of different members of the committee at Cambridge and at Dublin. The objects guessed have been chiefly cards from a full pack, and numbers between ten and one hundred ; but remarkable success has been obtained, also, in guessing names chosen at random, as in the following list :—

William Stubbs.	'William Stubbs.'
Sophia Shaw.	'Sophia Shaw.'
Timothy Taylor.	'Tom Taylor — Timothy Taylor.'
Isaac Harding.	'Isaac Harding.'
Albert Snelgrove.	'Albert Singrore — Albert Grover.'
Tom Thumb.	'Tom Thumb.'
Cinderella.	'Cinderella.'
Chester.	'Manchester — Chester.'
Pipe.	'Plate — paper — pipe.'
Fork.	'Fork.'
Corkscrew.	'Corkscrew.'
Tongs.	'Fire-irons — poker.'

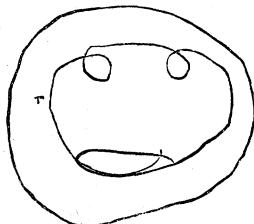
From the summary of results, it appears, that, out of every 610 trials with playing-cards, there were 118 correct guesses on the first trial, and 76 on the second; or that, counting the first trial only, there was 1 correct guess out of every 5.17, instead of 1 out of every 52, as would be given by chance alone. Of 260 numbers, 68 were guessed correctly the first time, and 35 the second time, or, on the first trial, 1 out of every 3.82; whereas from chance would have given only 1 out of every 90. Where the trial is counted as a failure, it frequently happened that the suit, or the number of pips of the card, or one figure of the number, was guessed correctly. The partial successes, as in the guesses for 'pipe' and 'tongs,' given above, strike us as even more remarkable, and more likely to throw light upon the subject, than the complete ones. The children, when questioned, agree in saying that two or three ideas of similar objects come before their minds, and that, after a moment's reflection, they select that which stands out with the greatest vividness. Their power, instead of improving with use, has been gradually diminishing. At first, especially when they were in good humor, and excited by the wonderful nature of their guessing, they seldom made a mistake. They have been known to name seventeen cards right in succession.¹ Their gradual decline of power somewhat suggests the disappearance of a transitory pathological condition. On the other hand, a larger number of good subjects has been found than there was reason at first to look for.

Much more remarkable than experiments with cards or numbers, where there is at least an appreciable chance of getting right by accident, are those in which an impression of a

drawing is conveyed from one mind to another, without contact, or any conceivable use of the ordinary means of communication. In these



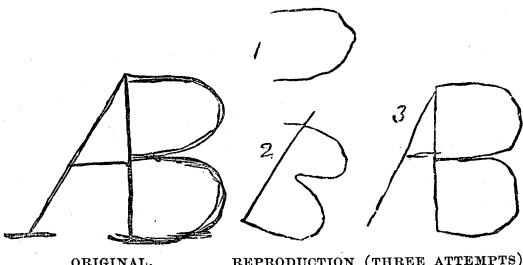
ORIGINAL.



REPRODUCTION.

Inner circle begun at point marked +, and then carried round in one continuous line from left to right.

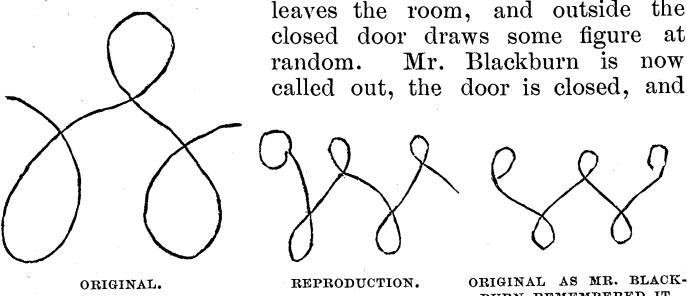
experiments, Mr. Blackburn, an associate of the society, who is described as a very painstaking and accurate observer, is the operator; and Mr. Smith, a young mesmerist of Brighton,



ORIGINAL.

REPRODUCTION (THREE ATTEMPTS).

is the subject. Mr. Smith is seated, blindfolded, at a table in one of the rooms of the society; paper and pencil are within his reach, and a member of the committee is seated by his side. Another member of the committee leaves the room, and outside the closed door draws some figure at random. Mr. Blackburn is now called out, the door is closed, and



ORIGINAL.

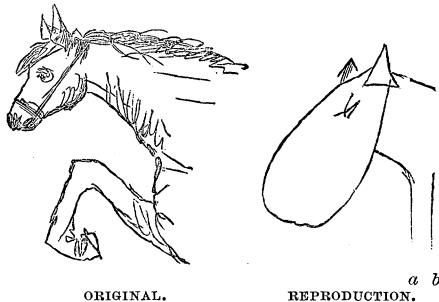
REPRODUCTION.

ORIGINAL AS MR. BLACKBURN REMEMBERED IT.

the drawing is held before his eyes for a few seconds. Closing his eyes, Mr. Blackburn is led back into the room, and placed, standing or sitting, behind Mr. Smith, at a distance of some two feet from him. After a brief period of intense mental concentration on Mr. Black-

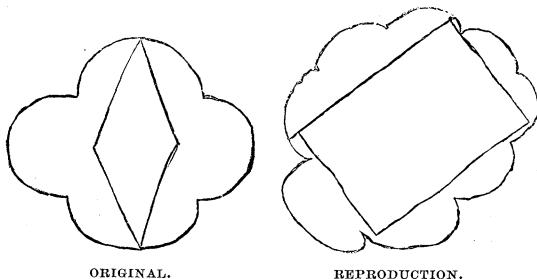
¹ The chance of doing, which, by accident, is as 1 to 52¹⁷.

burn's part, Mr. Smith takes up the pencil, and, amidst the absolute silence of all present, reproduces as nearly as he can the impression he has received. Mr. Blackburn keeps his eyes closed (sometimes they are bandaged as an aid to concentration); and he has not touched Mr. Smith, and has not gone in front of him, or in any way within his possible range



Mr. Smith had no idea that the original was not a geometrical diagram. He added line *b* some time after he had drawn line *a*, 'seeing a line parallel to another somewhere.'

of vision, since he re-entered the room. Sixty pages of the drawings and reproductions are given,—facsimiles of the originals from which they have been photographed on the wood blocks. The reproductions are rude copies of the drawings, such as a child might make, blindfold, of a picture he had just seen; but in every case the resemblance is recognizable, and sometimes it is very exact. A particularly good one was made, when, with a view of removing all doubt as to possible auditory communication, Mr. Smith's ears were stopped



with putty, a bandage was tied round his eyes and ears, a bolster-case was fastened over his head, and over all was thrown a blanket which enveloped his entire head and trunk; and Mr. Blackburn sat behind him as still as it is possible for a human being to sit who is not concentrating his attention on keeping motionless to the exclusion of every thing else. To profit by a code of signals in this case, Mr.

Smith would have had to extract the putty from his ears, and, still smothered in bolster-case and blanket, to detect periodic variations in Mr. Blackburn's breathing imperceptible to the committee, and to interpret them into a description of a very irregular figure. This hypothesis seems to the committee an extreme one, but they intend to meet it by still further varying the conditions of future experiments.

The record is given of another set of experiments made upon two young ladies at Liverpool, under the strictest conditions, by Mr. Guthrie and Mr. Birchall. The following were among the guesses:—

A gold cross.	'It is yellow—it is a cross.'
An egg.	'Looks remarkably like an egg.'
A penholder, with thimble inverted on the end.	'A column, with something bell-shaped turned down on it.'
Letter Q.	'Q.'
A dark-crimson apple.	'Is it round—a dark-red shade—like a knob of a door?—It is an apple.'
A key.	'A little tiny thing, with a ring at one end, and a little flag at the other, like a toy-flag.' Urged to name it, replied, 'It is very like a key.'
A pair of scissors standing open and upright.	'Is it silver?—No: it is steel—it is a pair of scissors standing upright.'

The usual phenomena were obtained by the committee on mesmerism, but with the utmost precaution against collusion and fraud. The cases which do most to stagger a cultivated scepticism are those in which the subject remains in a perfectly normal condition, with the exception of *local* effects produced on him without contact, and without any possibility of expectation on his part. The following experiment was repeated thirty or forty times without a single failure. The subject was blindfolded and seated at a table, on which his ten fingers were spread out before him. A screen formed of thick brown paper quadruply folded was placed in front of him, extending far beyond him in all directions. Two of his fingers were then selected by one of the committee, and silently pointed out to the mesmerizer, who proceeded to make very gentle passes over them; and to prevent the communication to the subject of a sensation of change of temperature, or a current of air, a member of the committee made, as nearly as possible, similar passes over two others of his fingers. After a min-

ute or less, the two fingers mesmerized proved to be perfectly stiff and insensible: the points of sharp instruments might be plunged deep into them, or a lighted match might be applied to the sensitive region around the nail, without producing a sign or a murmur. It is difficult to suppose that an ordinary youth, sitting with relaxed limbs in quiet unconcern, would be able to control, by the exercise of his will, every sort of reflex start or twitch when a naked flame is applied to one of the most sensitive parts of his person. To meet such an objection, however, the experiments were repeated with other subjects with equal success,—one of them a delicate woman, whose shrinking from pain was such that the prick of a fork on one of her unmesmerized fingers would cause a half-hysterical cry. The hands of the subject may even be mesmerized when he is in the mesmeric sleep; and then the usual clap and call restore him to consciousness, but do not permit him to remove his hands from the sofa, to which they seem to be glued, until after they have been separately released.

We pass over the report of the Reichenbach committee, of the literary committee, and of the committee on haunted houses, but not because they do not contain a great deal of very interesting and striking matter. The addresses of the president, too, are models of clear, careful, and forcible writing; and the proceedings as a whole cannot fail to produce a strong effect upon a reasonably unprejudiced reader, especially when it is considered that all this is in addition to the varying amount of testimony and experience that has been for years in the possession of nearly all of us. In no other subject has there been such a long dispute over the reality of the phenomena: even the witnesses to globular lightning have gained credence for themselves at last. No other subject, as is perfectly natural, has been so inex-

tricably mixed up with fraud and chicane, and has fallen, in consequence, under such a weight of obloquy. There has usually been, besides, a peculiarly ‘unwashed’ flavor about the possessors of these mysterious powers which are denied to people in general. The travelling mesmerizer has not been an attractive specimen of humanity, and to that fact has been allowed more than its due effect. In other undecided scientific questions, weight of authority has counted for something, but not the weight of a man’s family connections. Even when it was said that such unexceptionable witnesses as De Morgan and Wallace and Crookes had become convinced that certain facts not generally admitted were really facts, one could not help believing that they differed in some way from the ordinary sane scientific man, and that some peculiar crookedness of mental vision was the source of their strange belief. Another refuge of incredulity has been national and sectional distrust: it was chiefly outside of the centres of learning that such things went on. Mr. Sidgwick was once told by a German, that they happened only in England or America, or France or Italy, or Russia, or some half-educated country, but not in the land of *geist*. If this society does not at once convince all the world of the truth of its phenomena, it has at least accomplished the feat of suddenly elevating them into the region of respectability; and hereafter any one can admit his belief in them without shamefacedness. Now that mesmerism and mind-reading have ceased to be exclusively the property of travelling-shows and after-dinner entertainments, and have become a subject of experiment in laboratories, it is to be hoped that their extent and limitations will be speedily defined, and that the vagueness and haze in which they have hitherto been enveloped will soon be replaced by definite knowledge.

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

U. S. geological survey.

Study of metamorphic rocks.—Prof. R. D. Irving, after consultation with the other lithologists of the survey, and with Dr. Williams of Baltimore, is confirmed in his view of the occurrence of a secondary brown hornblende (as announced by him in 1880 and in 1883) produced by the alteration of augitic minerals. This occurrence is one hitherto denied by the best German authorities; and the cases described by

Mr. Irving have been supposed to be probably cases of envelopment such as are well known to occur. This, of course, has no reference to the occurrence of a green hornblende as an alteration product of augite. Most of the sections made by Mr. Irving and his assistants, showing secondary hornblende, show this variety, only a few localities yielding rocks in sections of which the brown variety occurs as a secondary product.

Mr. Merriam, of Professor Irving’s division, has been experimenting on the photographing of thin